

THE RIO ALEGRE VOLCANOSEDIMENTARY SEQUENCE (SW AMAZONIAN CRATON, BRAZIL): CHEMICAL AND ISOTOPE (U/Pb AND Sm/Nd) CONSTRAINTS AND TECTONIC IMPLICATIONS

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The Rio Alegre volcanosedimentary sequence occurs in the SW Amazonian craton and may be subdivided into the Minouro Formation comprised of metabasites, banded iron formations, chemical sedimentary rocks and cherts; Santa Isabel Formation comprised of metabasalts, metapyroclastic rocks and metarhyodacites; and the São Fabiano Formation, which includes clastic and chemical metasedimentary rocks (phyllites, quartzites and carbonaceous layers), cherts, and metavolcanoclastic rocks. Intrusive felsic plutons range from tonalite to granodiorite.

Metavolcanic and metaintrusive rocks suggest a subalkaline signature formed in a back-arc ocean-floor environment and are a result of an evolution and differentiation of tholeiitic magmas. Mineralogical alterations in these rocks are typical of ocean floor metasomatic processes such as epidotization, carbonatization and sericitization. The geochemical data for intrusive felsic rocks indicate a calc-alkaline suite.

Magmatic activity of the Rio Alegre Terrane occurred during two time periods. Basic to intermediate rocks from 1509 Ma to 1494 Ma, with $\epsilon_{Nd(t)}$ values from +4.3 to +4.7 that indicate the volcanic rocks are juvenile. Two intrusive felsic rocks yielded U/Pb ages of 1465 ± 4 Ma and 1481 ± 7 Ma, $\epsilon_{Nd(t)}$ values from +3.8 to +4.1 and T_{DM} from 1.53 Ga to 1.50 Ga, suggesting that these plutonic rocks may be part of a juvenile terrane.

The Rio Alegre orogen is interpreted as having originated at a mid-ocean ridge at ~1.50 Ga, metasomatized under sea water, and metamorphosed under greenschist to amphibolite facies and transposed until mylonitized. The accretionary process to the proto-Amazonian Craton probably occurred during the subduction of this oceanic crust at 1.48-1.46 Ga during the formation of the felsic arc-related rocks.